UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

Note to Reader

Background: As part of its effort to involve the public in the implementation of the Food Quality Protection Act of 1996 (FQPA), which is designed to ensure that the United States continues to have the safest and most abundant food supply. EPA is undertaking an effort to open public dockets on the organophosphate pesticides. These dockets will make available to all interested parties documents that were developed as part of the U.S. Environmental Protection Agency's process for making reregistration eligibility decisions and tolerance reassessments consistent with FQPA. The dockets include preliminary health assessments and, where available, ecological risk assessments conducted by EPA, rebuttals or corrections to the risk assessments submitted by chemical registrants, and the Agency's response to the registrants' submissions.

The analyses contained in this docket are preliminary in nature and represent the information available to EPA at the time they were prepared. Additional information may have been submitted to EPA which has not yet been incorporated into these analyses, and registrants or others may be developing relevant information. It's common and appropriate that new information and analyses will be used to revise and refine the evaluations contained in these dockets to make them more comprehensive and realistic. The Agency cautions against premature conclusions based on these preliminary assessments and against any use of information contained in these documents out of their full context. Throughout this process, If unacceptable risks are identified, EPA will act to reduce or eliminate the risks.

There is a 60 day comment period in which the public and all interested parties are invited to submit comments on the information in this docket. Comments should directly relate to this organophosphate and to the information and issues available in the information docket. Once the comment period closes, EPA will review all comments and revise the risk assessments, as necessary.

These preliminary risk assessments represent an early stage in the process by which EPA is evaluating the regulatory requirements applicable to existing pesticides. Through this opportunity for notice and comment, the Agency hopes to advance the openness and scientific soundness underpinning its decisions. This process is designed to assure that America continues to enjoy the safest and most abundant food supply. Through implementation of EPA's tolerance reassessment program under the Food Quality Protection Act, the food supply will become even safer. Leading health experts recommend that all people eat a wide variety of foods, including at least five servings of fruits and vegetables a day.

Note: This sheet is provided to help the reader understand how refined and developed the pesticide file is as of the date prepared, what if any changes have occurred recently, and what new information, if any, is expected to be included in the analysis before decisions are made. **It is not meant to be a summary of all current information regarding the chemical.** Rather, the sheet provides some context to better understand the substantive material in the docket (RED chapters, registrant rebuttals, Agency responses to rebuttals, etc.) for this pesticide.

Further, in some cases, differences may be noted between the RED chapters and the Agency's comprehensive reports on the hazard identification information and safety factors for all organophosphates. In these cases, information in the comprehensive reports is the most current and will, barring the submission of more data that the Agency finds useful, be used in the risk assessments.

Jack E. Housenger, Acting Director
Special Review and Reregistration Division

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
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AND TOXIC SUBSTANCES

DATE: June 8, 1999

SUBJECT: **Chlorpyrifos-Methyl: Acute and Chronic Dietary Exposure Analyses**.
Chemical #: 059102. DP Barcode: D256070.

FROM: Sarah Law, Chemist
Reregistration Branch 3
Health Effects Division

THROUGH: Susie Chun, Chemist
Registration Action Branch 1
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Steve Knizner, Branch Senior Scientist
Reregistration Branch 3
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TO: Mark Hartman, Chemical Review Manager
Reregistration Branch 2
Special Review and Reregistration Division 7508C

Action Requested

Provide refined Tier 3 acute and chronic dietary exposure analyses of the organophosphate, chlorpyrifos-methyl (CPM), for the uses supported through reregistration. The acute and chronic analyses should utilize available monitoring data for CPM. For both the acute and chronic analyses, processing factors should be incorporated where appropriate and no adjustment should be made for percent crop treated (% CT).

Executive Summary

Because chlorpyrifos-methyl is an organophosphate, acute and chronic dietary risk concerns using the Dietary Exposure Evaluation Model (DEEM™) prompted HED to conduct refined acute and chronic dietary risk analyses. Refined acute dietary exposure and risk estimates associated with the supported uses of chlorpyrifos-methyl **exceeded HED's level of concern** for all population subgroups. Refined chronic dietary exposure and risk estimates associated with the supported uses of chlorpyrifos-methyl **exceeded HED's level of concern** for the U.S. population and several U.S. population subgroups. Based on examination of the acute critical exposure contribution (CEC) file, it appears that consumption of wheat grain (RAC), rather than meat or milk, contributes to the risk most significantly.

Toxicological Information

Table 1 provides a summary of toxicological endpoints for use in human risk assessments. A detailed description of the rationale for selection of the doses and endpoints can be found in the Hazard Identification Assessment Review Committee (HIARC) report (HIARC Document, 5/17/99).

The toxicology database for chlorpyrifos-methyl is not considered complete. Developmental toxicity assessment is considered incomplete because there is only an acceptable rat study but no acceptable rabbit (or second species) study and there is no acceptable multi-generation reproduction study. Since the developmental toxicity database is incomplete, the assessment for increased susceptibility to fetuses and neonates is also incomplete. There is also no general metabolism study that adequately assesses the uptake, distribution, retention and excretion or identification of metabolites. The mutagenicity database conforms to current standards and was noted to be positive only in an *in vitro* cytogenic assay in the presence of metabolic activation. The HIARC could not make a determination on the increased susceptibility to infants and children (as required by FQPA) to chlorpyrifos-methyl due to the inadequate toxicology database.

Table 1. Toxicology Endpoints Selected for Risk Assessments.

EXPOSURE SCENARIO	DOSE (mg/kg/day)	ENDPOINT	STUDY
Acute Dietary	NOAEL= 1.0 mg/kg/day (100 UF) (10x FQPA)	Inhibition of red blood cell cholinesterase.	Rat Developmental Toxicity Study (MRID No.: 44680603)
	Acute RfD = 0.01 mg/kg Acute PAD = 0.001mg/kg		
Chronic Dietary	NOAEL= 0.1 mg/kg/day (100 UF) (10x FQPA)	Inhibition of plasma cholinesterase.	Rat Chronic/Carcinogenicity Feeding Study (MRID No.: 42269001)
	Chronic RfD = 0.001 mg/kg/day Chronic PAD = 0.0001 mg/kg/day		
Carcinogenicity	Classified as "not likely a human carcinogen." Carcinogenicity risk assessment is not appropriate.		

Based on the hazard and exposure data, the HED FQPA Safety Factor Assessment Review Committee determined that the additional 10x factor should be retained. Application of the 10x FQPA Safety Factor resulted in the **acute Population Adjusted Dose (aPAD) of 0.001 mg/kg/day** for acute dietary risk assessment. Application of the 10x FQPA Safety Factor resulted in the **chronic Population Adjusted Dose (cPAD) of 0.0001 mg/kg/day** for chronic dietary risk assessment (FQPA Safety Factor Recommendations for the organophosphates, 8/06/98). The PAD is an acute or chronic RfD modified by the acute or chronic FQPA Safety Factor, respectively (RfD/FQPA Safety Factor = PAD).

Residue Information

Tolerances have been established for residues of CPM [*O,O*-dimethyl-*O*-(3,5,6-trichloro-2-pyridyl) phosphorothioate] and its metabolite 3,5,6-trichloro-2-pyridinol (TCP) in/on barley, oats, rice, sorghum, and wheat grain at 6.0 ppm; tolerances for milled fractions (excluding flour) of each of these raw agricultural commodities (RACs) have been established at 30 ppm (rice and wheat), 90 ppm (barley and sorghum), and 130 ppm (oats) under 40 CFR §185.1050 and §186.1050. Tolerances have also been established for residues of CPM in milk and milk fat at 0.05 and 1.25 ppm, respectively, eggs at 0.1 ppm, and in meat, meat-by-products (mbyp) and fat of cattle, goats, hogs, horses, poultry and sheep at 0.5 ppm [§180.419]. CPM is an insecticide registered for use on stored grain crops including barley, oats, rice, sorghum, and wheat; its use is limited to post-harvest treatment of stored grains or grain storage facilities.

The qualitative nature of the residue in plants and animals is adequately understood based on stored grain (corn and wheat) and ruminant and poultry metabolism studies. HED had previously determined that TCP is no longer a residue of concern for chlorpyrifos (a structurally similar OP insecticide) because of its inactivity as a cholinesterase inhibitor (E. Doyle, 4/1/91). Therefore, HED concluded that TCP need not appear in the tolerance expression, and that tolerances are to be expressed in terms of CPM *per se* (M. Flood, 4/29/91).

Refinements such as anticipated residues (ARs) are a way to estimate actual exposures, as opposed to high-end estimates (i.e., tolerances). Data from the USDA PDP Monitoring data are available. Out of 1,562 monitoring data samples from PDP (1995-1997) for wheat, 920 samples had detectable residues; see Table 2 for details. The wheat PDP residue values were translated to the other supported RACs (barley, oats, rice and sorghum) because the use pattern of CPM is the same. Out of 1,297 monitoring data samples from PDP (1996-1997) for milk, there were no detectable residues; see Table 3 for details. The PDP residue values should be used in the acute and chronic dietary exposure assessments.

In general, the FDA Surveillance Monitoring data (1992-1998) supported the percentage of detections found in wheat by PDP. When choosing which data set to use for a Monte Carlo assessment, the order of preference is generally PDP data > FDA data > field trial data. Monitoring data is preferred over field trial data because it is sampled longer after harvest and is therefore more reflective of residues consumed "at the dinner plate"; PDP data is preferred over FDA data because of the statistical design of the PDP program specific for dietary risk assessment and because the foods are prepared before analysis as they would be at home (i.e. peeling, washing, etc.). Monitoring data can be "decomposited" prior to use in acute dietary risk assessment; however, this is not necessary for CPM because the RAC's in which it is used on are considered "blended" commodities.

Table #2. Summary of Wheat PDP Data.

Crop	**Year**	**# of Samples Analyzed**	**# of Detects**	**% of Detects**	**Minimum Concentration (ppm)**	**Maximum Concentration (ppm)**	**Average Concentration (ppm)**	**LOD (ppm)**
Wheat	1995	600	325	54	0.002	3.322	0.11	0.001
Wheat	1996	340	249	73	0.002	1.525	0.09	0.001
Wheat grain	1997	622	346	56	0.002	1.796	0.11	0.001

Table #3. Summary of Milk PDP Data.

Crop	**Year**	**# of Samples Analyzed**	**# of Detects**	**% of Detects**	**Minimum Concentration (ppm)**	**Maximum Concentration (ppm)**	**Average Concentration (ppm)**	**LOD Range (ppm)**
Milk	1996	570	0	0	0	0	0	0.001-0.002
Milk	1997	727	0	0	0	0	0	0.001-0.002

For the purposes of dietary risk assessment, acute and chronic ARs for CPM have been calculated for barley, oats, rice, sorghum, grain, meat, milk, poultry and eggs; see summary Table 4.

Table # 4. Acute and Chronic ARs for Dietary Risk Assessment [1].

Commodity	Acute AR [2] (ppm)	Chronic AR [3] (ppm)	Processing Factor
Barley, grain [4]	PDP Data	0.06	2.1 X for bran
Oats, grain [5]	PDP Data	0.06	2.5 X hulls
Rice, grain [6]	PDP Data	0.06	3.6 X hulls 1.8 X bran
Sorghum, grain [7]	PDP Data	0.06	NA
Wheat, grain [8]	PDP Data	0.06	2.1 X bran 3.2 X shorts 1.5 X reddog 2.7 X germ
Fat of cattle, goats, hots, horses and sheep	0.008	0.008	N/A
Meat of cattle, goats, horses and sheep	0.0001	0.0001	N/A
Liver of cattle, goats, horses and sheep	0.0001	0.0001	N/A
Kidney of cattle, goats, horses and sheep	0.0004	0.0004	N/A
Hogs, fat	0.007	0.007	N/A
Hogs, muscle	0.001	0.001	N/A
Hogs, mbyp	0.00009	0.00009	N/A
Milk	PDP Data	0.0007	N/A

Milk, fat	PDP Data	0.0007	N/A
Poultry, fat	0.00004	0.00004	N/A
Poultry, meat	0.000005	0.000005	N/A
Poultry, liver	0.000005	0.000005	N/A
Eggs	0.00001	0.00001	N/A

[1] Acute and chronic ARs for dietary risk assessment from CPM Residue Chemistry Chapter (S. Law, 6/8/99, D256666).

[2] The acute dietary risk assessment should utilize the entire distribution of monitoring data (PDP) of CPM residue value detections with no further adjustment for % CT; ½ LOD should be used for non-detects. Processing factors should be incorporated where appropriate.

[3] The chronic dietary risk assessment should utilize the monitoring data (PDP) for the RAC incorporating ½ the LOD (for treated non-detects) to calculate the average residue. The chronic RAC ARs given here are the average residue value from the PDP data, incorporating ½ the LOD (the PDP LOD = 0.001 ppm for all 3 years). The chronic milk and milk fat ARs given here are the average residue values from the 1996-97 PDP data (all non-detectable residues, therefore ½ the average LOD was used [range= 0.001-0.002 ppm]). Processing factors should be incorporated where appropriate. No further adjustment should be made for % CT.

[4] The available processing study on barley does not provide residue data on pearled barley, flour or bran; however, data from the wheat processing study are translatable to barley.

[5] Data on oat flour are not available; however, the wheat processing study indicates that residues of CPM *per se* do not concentrate in flour.

[6] The available rice processing study indicates that residues of CPM *per se* do not concentrate in polished rice.

[7] The sorghum processing study demonstrated that residues of CPM do not concentrate appreciably (1.4 X) in sorghum flour. Furthermore, flour is the only sorghum processed commodity currently regulated and is used exclusively in the U.S. as a component for drywall, and not as either a human food or livestock feed.

[8] The available wheat processing study indicates that residues of CPM *per se* do not concentrate in flour.

DEEM™ default processing factors were utilized in both the acute and chronic analyses for the meat, poultry and eggs.

Results/Discussion

The Dietary Exposure Evaluation Model (DEEM™) analysis evaluated the dietary exposure based on individual consumption data from USDA 1989-1992 Nationwide Continuing Surveys of Food Intake by Individuals (CSFII). HED's level of concern for acute and chronic dietary risk is 100% of the aPAD and cPAD. A complete list of acute and chronic dietary exposures for all subpopulations is presented in Attachment 2 and 4, respectively.

Subgroups in Tables 5 and 6 represent the highest dietary exposure for the U.S. population and respective subgroups (i.e., children, females, and the other general population subgroups).

Table 5. Acute Probabilistic Dietary Exposure Results for Chlorpyrifos-methyl.

Subgroups	95th Percentile Exposure (% aPAD)	99th Percentile Exposure (% aPAD)	99.9th Percentile Exposure (% aPAD)
U.S. Population	0.000559 (56)	0.001644 (164)	0.004640 (464)
Non-nursing infants (< 1 year old)	0.000701 (70)	0.002280 (228)	0.007105 (711)
Children (1-6 years old)	0.001274 (127)	0.003409 (341)	0.008346 (835)
Females (13-19 years old/not pregnant/not nursing)	0.000500 (50)	0.001400 (140)	0.003592 (359)
Males (13-19 years old)	0.000570 (57)	0.001609 (161)	0.004117 (412)

Table 6. Chronic Dietary Exposure Results for Chlorpyrifos-methyl.

Subgroups	Chronic Total Exposure (mg/kg/day)	Chronic Risk (% cPAD)
U.S. Population	0.000124	124 %
Non-nursing infants (< 1 year old)	0.000148	149 %
Children (1-6 years old)	0.000288	288 %
Females (13-19 years old/not pregnant/not nursing)	0.000108	108 %
Males (13-19 years old)	0.000126	126 %

The results of the acute and chronic analyses indicate that the acute probabilistic and chronic dietary risk estimates associated with the proposed uses of chlorethoxyfos are **above the Agency's level of concern** (> 100% aPAD; > 100% cPAD) for all population subgroups.

List of Attachments

Attachment 1: Acute Residue Information
Attachment 2: Acute DEEM™ Analysis (S. Law, 6/02/99)
Attachment 3: Acute Residue Distribution Files
Attachment 4: Chronic Residue Information
Attachment 5: Chronic DEEM™ Analysis (S. Law, 6/02/99)

cc: S. Law 6/8/99 (RRB3), S. Knizner 6/8/99 (RRB3), L. Richardson (CEB1)
RDI: Dietary SAC 6/1/99
S. Law: 821E,CM#2: (703)305-0783:7509C:RRB3

Attachment 1: Acute Residue Information

U.S. Environmental Protection Agency Ver. 6.78
DEEM Acute analysis for CHLORPYRIFOS METHYL 1989-92 data
Residue file name: C:\DEEM\CHLORMETHYL\Acute\059102Ra3.R96 Adjust. #2 NOT used
Analysis Date 06-02-1999 Residue file dated: 06-02-1999/10:08:05/8
Reference dose (aRfD) = 0.001 mg/kg bw/day
Comment: Acute Tier 3: PDP DATA (1/2 LOD), AR'S, Processing Factors

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RDF indices and file names for Monte Carlo Analysis
1 wheat.rdf
2 milk.rdf

Food	Crop Grp	Food Name	RESIDUE (ppm)	RDF #	Adj.Factors #1	Code #2
265	15	Barley	2.000000	1	1.000	1.000
269	15	Oats	2.000000	1	1.000	1.000
270	15	Rice-rough (brown)	2.000000	1	1.000	1.000
271	15	Rice-milled (white)	2.000000	1	1.000	1.000
275	15	Sorghum (including milo)	2.000000	1	1.000	1.000
276	15	Wheat-rough	2.000000	1	1.000	1.000
277	15	Wheat-germ	2.000000	1	2.700	1.000
278	15	Wheat-bran	2.000000	1	2.100	1.000
279	15	Wheat-flour	2.000000	1	1.000	1.000
318	D	Milk-nonfat solids	2.000000	2	1.000	1.000
319	D	Milk-fat solids	2.000000	2	1.000	1.000
320	D	Milk sugar (lactose)	2.000000	2	1.000	1.000
321	M	Beef-meat byproducts	0.000400	0	1.000	1.000
322	M	Beef-other organ meats	0.000400	0	1.000	1.000
323	M	Beef-dried	0.000100	0	1.920	1.000
324	M	Beef-fat w/o bones	0.008000	0	1.000	1.000
325	M	Beef-kidney	0.000400	0	1.000	1.000
326	M	Beef-liver	0.000100	0	1.000	1.000
327	M	Beef-lean (fat/free) w/o bones	0.000100	0	1.000	1.000
328	M	Goat-meat byproducts	0.000400	0	1.000	1.000
329	M	Goat-other organ meats	0.000400	0	1.000	1.000
330	M	Goat-fat w/o bone	0.008000	0	1.000	1.000
331	M	Goat-kidney	0.000400	0	1.000	1.000
332	M	Goat-liver	0.000100	0	1.000	1.000
333	M	Goat-lean (fat/free) w/o bone	0.000100	0	1.000	1.000
334	M	Horsemeat	0.000100	0	1.000	1.000
336	M	Sheep-meat byproducts	0.000400	0	1.000	1.000
337	M	Sheep-other organ meats	0.000400	0	1.000	1.000
338	M	Sheep-fat w/o bone	0.008000	0	1.000	1.000
339	M	Sheep-kidney	0.000400	0	1.000	1.000
340	M	Sheep-liver	0.000100	0	1.000	1.000
341	M	Sheep-lean (fat free) w/o bone	0.000100	0	1.000	1.000
342	M	Pork-meat byproducts	0.000090	0	1.000	1.000
343	M	Pork-other organ meats	0.000090	0	1.000	1.000
344	M	Pork-fat w/o bone	0.007000	0	1.000	1.000
345	M	Pork-kidney	0.000090	0	1.000	1.000
346	M	Pork-liver	0.000090	0	1.000	1.000
347	M	Pork-lean (fat free) w/o bone	0.001000	0	1.000	1.000
355	P	Turkey-byproducts	0.000005	0	1.000	1.000
356	P	Turkey-giblets (liver)	0.000005	0	1.000	1.000
357	P	Turkey--fat w/o bones	0.000040	0	1.000	1.000
358	P	Turkey- lean/fat free w/o bones	0.000005	0	1.000	1.000
360	P	Poultry-other-lean (fat free) w/	0.000005	0	1.000	1.000
361	P	Poultry-other-giblets(liver)	0.000005	0	1.000	1.000
362	P	Poultry-other-fat w/o bones	0.000040	0	1.000	1.000
363	P	Eggs-whole	0.000010	0	1.000	1.000
364	P	Eggs-white only	0.000010	0	1.000	1.000
365	P	Eggs-yolk only	0.000010	0	1.000	1.000
366	P	Chicken-byproducts	0.000005	0	1.000	1.000
367	P	Chicken-giblets(liver)	0.000005	0	1.000	1.000
368	P	Chicken-fat w/o bones	0.000040	0	1.000	1.000

369	P	Chicken-lean/fat free w/o bones	0.000005	0	1.000	1.000
385	P	Chicken-giblets (excl. liver)	0.000005	0	1.000	1.000
398	D	Milk-based water	2.000000	2	1.000	1.000
399	15	Oats-bran	2.000000	1	1.000	1.000
408	15	Rice-bran	2.000000	1	1.800	1.000
437	15	Wheat-germ oil	2.000000	1	2.700	1.000
449	P	Turkey-other organ meats	0.000005	0	1.000	1.000

Attachment 2: Acute DEEM™ Analysis

U.S. Environmental Protection Agency Ver. 6.78
DEEM ACUTE analysis for CHLORPYRIFOS METHYL (1989-92 data)
Residue file: 059102Ra3.R96 Adjustment factor #2 NOT used.
Analysis Date: 06-02-1999/12:35:38 Residue file dated: 06-02-1999/10:08:05/8
Acute Reference Dose (aRfD) = 0.001000 mg/kg body-wt/day
MC iterations = 1000 MC list in residue file MC seed = 10
Run Comment: Acute Tier 3: PDP DATA (1/2 LOD), AR'S, Processing Factors

Summary calculations:

	95th Percentile		99th Percentile		99.9th Percentile	
	Exposure	% aRfD	Exposure	% aRfD	Exposure	% aRfD
U.S. pop - all seasons:	0.000559	55.86	0.001644	164.36	0.004640	464.00
All infants (<1 year):	0.000603	60.26	0.002197	219.69	0.007504	750.39
Nursing infants (<1 year):	0.000230	22.98	0.001529	152.91	0.007728	772.81
Non-nursing infants (<1 yr):	0.000701	70.11	0.002280	228.02	0.007105	710.50
Children (1-6 years):	0.001274	127.39	0.003409	340.94	0.008346	834.65
Children (7-12 years):	0.000839	83.91	0.002309	230.92	0.005794	579.39
Females (13+/preg/not nsg):	0.000445	44.52	0.001244	124.41	0.003056	305.56
Females (13+/nursing):	0.000577	57.68	0.001584	158.41	0.004028	402.83
Females (13-19 yrs/np/nn):	0.000500	50.00	0.001400	140.03	0.003592	359.17
Females (20+ years/np/nn):	0.000395	39.46	0.001124	112.44	0.002884	288.36
Females (13-50 years):	0.000432	43.21	0.001237	123.69	0.003167	316.71
Males (13-19 years):	0.000570	56.97	0.001609	160.86	0.004117	411.71
Males (20+ years):	0.000477	47.70	0.001343	134.29	0.003556	355.64
Seniors (55+):	0.000383	38.29	0.001051	105.08	0.002664	266.44

Attachment 3: Acute Residue Distribution Files

#1:

WHEAT	0.009	0.015	0.083	0.181	0.004	0.002	0.02	0.047	0.009	0.014	0.002	0.011	0.174	0.114
TOTALNZ=	0.015	0.199	0.056	0.065	0.029	0.002	0.022	0.018	0.002	0.004	0.037	0.224	0.007	0.002
920	0.004	0.054	0.002	0.142	0.212	0.093	0.006	0.136	0.027	0.002	0.002	0.277	0.021	0.356
TOTALZ=0	0.007	0.007	0.016	0.002	0.032	0.002	0.23	0.005	0.002	0.004	0.004	0.206	0.038	0.002
TOTALLOD	0.002	0.043	0.002	0.377	0.044	0.002	0.146	0.002	0.002	0.76	0.002	0.002	0.052	0.002
=642	0.004	0.017	0.289	0.023	0.041	0.043	0.064	0.002	0.002	0.013	0.009	0.002	0.002	0.013
LODRES=0	0.057	0.208	0.005	0.291	0.316	0.002	0.02	0.219	0.002	0.002	0.002	0.096	0.014	0.002
.0005	0.194	0.009	1.796	0.004	0.051	0.007	0.025	0.002	0.002	0.002	0.137	0.013	0.002	0.008
0.002	0.071	0.533	0.32	1.1	0.082	0.006	0.273	0.362	0.002	0.658	0.142	0.04	0.005	0.002
0.006	0.078	0.002	0.002	0.071	0.265	0.011	0.006	0.082	0.065	0.007	0.002	0.056	0.002	0.019
0.005	0.09	0.014	0.006	0.395	0.493	0.328	0.005	0.002	0.063	0.057	0.011	0.002	0.02	0.002
0.007	0.095	0.007	0.263	0.373	0.387	0.205	0.006	0.005	0.005	0.002	0.004	0.011	0.017	0.008
0.002	0.061	1.435	0.018	0.004	0.144	0.005	0.063	0.014	0.002	0.004	0.014	0.005	0.266	0.008
0.002	0.002	0.089	0.002	0.005	0.152	0.004	0.002	0.002	0.091	0.007	0.315	0.296	0.002	0.023
0.027	0.002	0.002	1.425	0.114	0.08	0.02	0.01	0.002	0.002	0.002	0.002	0.015	0.011	0.04
0.018	0.002	0.198	0.002	0.005	0.39	0.085	0.002	0.014	0.004	0.053	0.03	0.002	0.098	0.133
0.006	0.004	0.004	0.026	0.002	0.025	0.014	0.002	0.039	0.014	0.002	0.053	0.057	1.025	0.114
0.342	0.106	0.02	0.004	0.274	0.004	0.033	0.012	0.061	0.019	0.015	0.034	0.005	0.004	0.008
0.002	0.379	0.091	0.019	0.015	0.928	0.012	0.002	0.011	0.087	0.005	0.154	0.002	0.397	0.029
0.009	0.004	0.158	0.018	0.099	0.035	0.242	0.98	0.007	0.004	0.002	0.002	0.012	0.002	0.021
0.002	0.241	0.002	0.002	0.248	0.009	0.005	0.186	0.002	0.004	0.023	0.862	0.006	0.108	0.093
0.002	0.202	0.019	0.068	0.027	0.159	0.13	0.22	0.006	0.002	0.056	0.002	0.973	0.043	0.008
0.002	0.044	0.011	0.002	0.007	0.028	0.053	0.002	0.014	0.052	0.002	0.228	0.002	0.002	0.002
0.016	0.09	0.008	0.005	0.002	0.115	0.004	0.081	0.33	0.005	0.002	0.026	0.002	0.046	0.008
0.002	0.072	0.042	0.004	0.002	0.006	0.46	0.023	0.002	0.004	0.76	0.045	0.569	0.004	0.012
0.002	0.117	0.031	0.004	0.002	0.25	0.002	0.017	0.002	0.007	0.002	0.005	0.009	0.002	0.051
0.002	0.037	0.002	0.004	0.002	0.357	0.002	1.21	0.583	0.01	0.039	0.002	0.002	0.002	0.005
0.287	0.423	0.004	0.607	0.022	0.159	0.062	0.002	0.002	0.135	0.043	0.339	0.014	0.152	0.002
0.002	0.034	0.006	0.622	0.033	0.395	0.011	0.002	0.923	0.002	0.06	0.005	0.103	0.106	0.002
0.002	0.006	0.167	0.408	0.117	0.002	0.043	0.002	0.144	0.002	0.019	0.002	0.263	0.098	0.002
0.012	0.023	0.006	0.002	0.021	0.007	0.002	0.002	0.007	0.002	0.122	0.006	0.016	0.002	0.16
0.035	0.056	0.41	0.005	0.213	0.159	0.002	0.033	0.363	0.095	0.005	0.002	0.002	0.014	0.002
0.008	0.052	0.054	0.041	0.005	0.006	0.002	0.006	0.029	0.002	1.628	0.002	0.004	0.016	
0.002	0.047	0.061	0.484	0.263	0.007	0.025	0.002	0.025	0.016	0.029	0.199	0.266	0.051	
0.004	0.048	0.066	0.004	0.05	0.097	1.26	0.005	0.007	0.099	0.027	0.073	0.161	0.526	
0.04	0.061	0.069	0.274	0.261	0.013	0.021	0.002	0.021	0.014	0.114	0.483	0.146	0.007	
0.002	0.062	0.084	0.025	0.093	0.109	0.002	0.002	0.023	0.006	0.015	0.17	0.249	0.004	
0.274	0.113	0.085	0.33	0.126	0.226	0.031	0.002	0.029	0.02	0.002	0.076	0.068	0.218	
0.008	0.346	0.069	0.002	0.039	0.004	0.065	0.002	0.775	0.031	0.072	0.007	0.002	3.322	
0.013	0.015	0.07	0.002	0.074	0.03	0.004	0.002	0.009	0.04	0.02	0.002	0.002	0.042	
0.007	0.123	0.058	0.017	0.239	0.093	0.061	0.006	0.002	0.198	0.16	0.004	0.025	0.135	
0.032	0.064	0.002	0.002	0.061	0.625	0.005	0.002	1.525	0.032	0.002	0.427	0.002	0.013	
0.014	0.049	0.015	0.093	0.009	0.059	0.007	0.014	0.002	0.114	0.006	0.012	0.059	0.022	
0.002	0.013	0.002	0.056	0.184	0.02	0.004	0.002	0.042	0.984	0.032	0.244	0.014	0.002	
0.02	0.006	0.061	0.055	0.004	0.237	0.091	0.002	0.005	0.014	0.111	0.002	0.021	0.146	
0.022	0.021	0.004	0.045	0.009	0.209	0.022	0.007	0.002	0.383	0.03	0.633	0.005	0.108	
0.005	0.002	0.035	0.072	0.031	0.054	0.014	0.002	0.044	0.002	0.017	0.002	0.005	0.004	
0.084	0.006	0.01	0.035	0.004	0.03	0.242	0.002	0.002	0.038	0.002	0.007	0.015	0.002	
0.34	0.002	0.004	0.011	0.004	0.045	0.112	0.002	0.005	0.002	0.04	1.073	0.002	0.002	
0.06	0.007	0.023	0.235	0.002	0.021	0.002	0.002	1.24	0.013	0.155	0.002	0.004	0.012	
0.013	0.002	0.002	0.005	0.012	0.002	0.002	0.002	0.03	0.009	0.099	0.034	0.206	0.002	
0.002	0.089	0.008	0.006	0.002	0.025	0.106	0.004	0.585	0.002	0.04	0.04	0.007	0.007	
0.984	0.052	0.058	0.002	0.462	0.002	0.002	0.005	0.005	0.009	0.004	0.002	0.07	0.189	
0.035	0.041	0.005	0.017	0.294	0.182	0.007	0.02	0.112	0.002	0.02	0.004	0.084	0.002	
0.008	0.033	0.141	0.002	0.274	0.398	0.002	0.002	0.002	0.002	0.085	0.002	0.345	0.071	
0.281	0.018	0.004	0.004	0.018	0.241	0.002	0.002	0.74	0.027	0.002	0.732	0.006	1.835	
0.73	0.008	0.005	0.016	0.002	0.025	0.002	0.006	1.038	0.007	0.144	0.002	0.002	0.053	
0.005	0.049	0.007	0.006	0.023	0.004	0.809	0.002	0.022	0.002	0.015	0.04	0.005	0.021	
0.224	0.918	0.007	0.03	0.099	0.393	0.01	0.002	0.004	0.262	0.002	0.075	0.549	0.002	
0.219	0.006	0.017	0.16	0.002	0.075	0.044	0.006	0.004	0.115	0.319	0.002	0.005	0.005	
0.002	0.052	0.013	0.124	0.005	0.234	0.091	0.002	0.002	0.034	0.009	0.002	0.277	0.036	
0.008	0.024	0.011	0.66	0.653	0.288	0.008	0.002	0.006	0.002	0.548	0.006	0.135	0.009	
0.033	0.005	0.002	0.058	0.642	0.007	0.054	0.002	0.063	0.031	0.004	0.029	0.529	0.015	
0.004	0.085	0.086	0.005	0.023	0.059	0.006	0.004	0.087	0.171	0.088	0.156	0.158	0.005	

#2:
CHLORPYRIFOS MILK'96 & '97
TOTALZ=1297
TOTALFREQ = 2

827, 0.0005
470, 0.001

Attachment 4: Chronic Residue Information

U.S. Environmental Protection Agency Ver. 6.76
DEEM Chronic analysis for CHLORPYRIFOS METHYL 1989-92 data
Residue file: C:\DEEM\CHLORMETHYL\Chronic\059102Rc.R96 Adjust. #2 NOT used
Analysis Date 06-02-1999 Residue file dated: 06-02-1999/14:15:19/8
Reference dose (RfD) = 0.0001 mg/kg bw/day
Comment:Chronic Tier 3: PDP Mon. Data (ave. including 1/2 LOD), Processing Factors

Food Code	Crop Grp	Food Name	RESIDUE (ppm)	Adj.Factors #1	#2
265	15	Barley	0.060000	1.000	1.000
269	15	Oats	0.060000	1.000	1.000
270	15	Rice-rough (brown)	0.060000	1.000	1.000
271	15	Rice-milled (white)	0.060000	1.000	1.000
275	15	Sorghum (including milo)	0.060000	1.000	1.000
276	15	Wheat-rough	0.060000	1.000	1.000
277	15	Wheat-germ	0.060000	2.700	1.000
278	15	Wheat-bran	0.060000	2.100	1.000
279	15	Wheat-flour	0.060000	1.000	1.000
318	D	Milk-nonfat solids	0.000700	1.000	1.000
319	D	Milk-fat solids	0.000700	1.000	1.000
320	D	Milk sugar (lactose)	0.000700	1.000	1.000
321	M	Beef-meat byproducts	0.000400	1.000	1.000
322	M	Beef-other organ meats	0.000400	1.000	1.000
323	M	Beef-dried	0.000100	1.920	1.000
324	M	Beef-fat w/o bones	0.008000	1.000	1.000
325	M	Beef-kidney	0.000400	1.000	1.000
326	M	Beef-liver	0.000100	1.000	1.000
327	M	Beef-lean (fat/free) w/o bones	0.000100	1.000	1.000
328	M	Goat-meat byproducts	0.000400	1.000	1.000
329	M	Goat-other organ meats	0.000400	1.000	1.000
330	M	Goat-fat w/o bone	0.008000	1.000	1.000
331	M	Goat-kidney	0.000400	1.000	1.000
332	M	Goat-liver	0.000100	1.000	1.000
333	M	Goat-lean (fat/free) w/o bone	0.000100	1.000	1.000
334	M	Horsemeat	0.000100	1.000	1.000
336	M	Sheep-meat byproducts	0.000400	1.000	1.000
337	M	Sheep-other organ meats	0.000400	1.000	1.000
338	M	Sheep-fat w/o bone	0.008000	1.000	1.000
339	M	Sheep-kidney	0.000400	1.000	1.000
340	M	Sheep-liver	0.000100	1.000	1.000
341	M	Sheep-lean (fat free) w/o bone	0.000100	1.000	1.000
342	M	Pork-meat byproducts	0.000090	1.000	1.000
343	M	Pork-other organ meats	0.000090	1.000	1.000
344	M	Pork-fat w/o bone	0.007000	1.000	1.000
345	M	Pork-kidney	0.000090	1.000	1.000
346	M	Pork-liver	0.000090	1.000	1.000
347	M	Pork-lean (fat free) w/o bone	0.001000	1.000	1.000
355	P	Turkey-byproducts	0.000005	1.000	1.000
356	P	Turkey-giblets (liver)	0.000005	1.000	1.000
357	P	Turkey--fat w/o bones	0.000040	1.000	1.000

358	P	Turkey- lean/fat free w/o bones	0.000005	1.000	1.000
360	P	Poultry-other-lean (fat free) w/	0.000005	1.000	1.000
361	P	Poultry-other-giblets(liver)	0.000005	1.000	1.000
362	P	Poultry-other-fat w/o bones	0.000040	1.000	1.000
363	P	Eggs-whole	0.000010	1.000	1.000
364	P	Eggs-white only	0.000010	1.000	1.000
365	P	Eggs-yolk only	0.000010	1.000	1.000
366	P	Chicken-byproducts	0.000005	1.000	1.000
367	P	Chicken-giblets(liver)	0.000005	1.000	1.000
368	P	Chicken-fat w/o bones	0.000040	1.000	1.000
369	P	Chicken-lean/fat free w/o bones	0.000005	1.000	1.000
385	P	Chicken-giblets (excl. liver)	0.000005	1.000	1.000
398	D	Milk-based water	0.000700	1.000	1.000
399	15	Oats-bran	0.060000	1.000	1.000
408	15	Rice-bran	0.060000	1.800	1.000
437	15	Wheat-germ oil	0.060000	2.700	1.000
449	P	Turkey-other organ meats	0.000005	1.000	1.000

Attachment 5: Chronic DEEM™ Analysis

U.S. Environmental Protection Agency Ver. 6.76
DEEM Chronic analysis for CHLORPYRIFOS METHYL (1989-92 data)
Residue file name: C:\DEEM\CHLORMETHYL\Chronic\059102Rc.R96
Adjustment factor #2 NOT used.
Analysis Date 06-02-1999/14:15:54 Residue file dated: 06-02-1999/14:15:19/8
Reference dose (RfD, CHRONIC) = .0001 mg/kg bw/day
COMMENT 1: Chronic Tier 3: PDP Mon. Data (ave. including 1/2 LOD), Processing Factors

Total exposure by population subgroup

Population Subgroup	Total Exposure mg/kg body wt/day	Total Exposure Percent of Rfd
U.S. Population (total)	0.000124	124.1%
U.S. Population (spring season)	0.000121	121.2%
U.S. Population (summer season)	0.000125	124.5%
U.S. Population (autumn season)	0.000130	130.4%
U.S. Population (winter season)	0.000120	119.8%
Northeast region	0.000131	131.1%
Midwest region	0.000124	123.8%
Southern region	0.000119	119.3%
Western region	0.000125	125.5%
Hispanics	0.000123	122.8%
Non-hispanic whites	0.000124	123.7%
Non-hispanic blacks	0.000121	121.5%
Non-hisp/non-white/non-black)	0.000153	153.4%
All infants (< 1 year)	0.000122	122.5%
Nursing infants	0.000061	60.7%
Non-nursing infants	0.000148	148.5%
Children 1-6 yrs	0.000288	288.1%
Children 7-12 yrs	0.000187	187.0%
Females 13-19(not preg or nursing)	0.000108	108.3%
Females 20+ (not preg or nursing)	0.000085	84.9%
Females 13-50 yrs	0.000093	92.7%
Females 13+ (preg/not nursing)	0.000098	97.5%
Females 13+ (nursing)	0.000125	125.0%
Males 13-19 yrs	0.000126	126.1%
Males 20+ yrs	0.000105	104.6%
Seniors 55+	0.000083	83.5%
Pacific Region	0.000125	125.1%